# Dell MD Storage Array
# VMware® VASA 1.0 Provider
# User's Guide

# Notes, Cautions, and Warnings

**NOTE:** A NOTE indicates important information that helps you make better use of your computer

**CAUTION: A CAUTION indicates potential damage to hardware or loss of data if instructions are not followed.**

**WARNING: A WARNING indicates a potential for property damage, personal injury, or death.**

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# 1

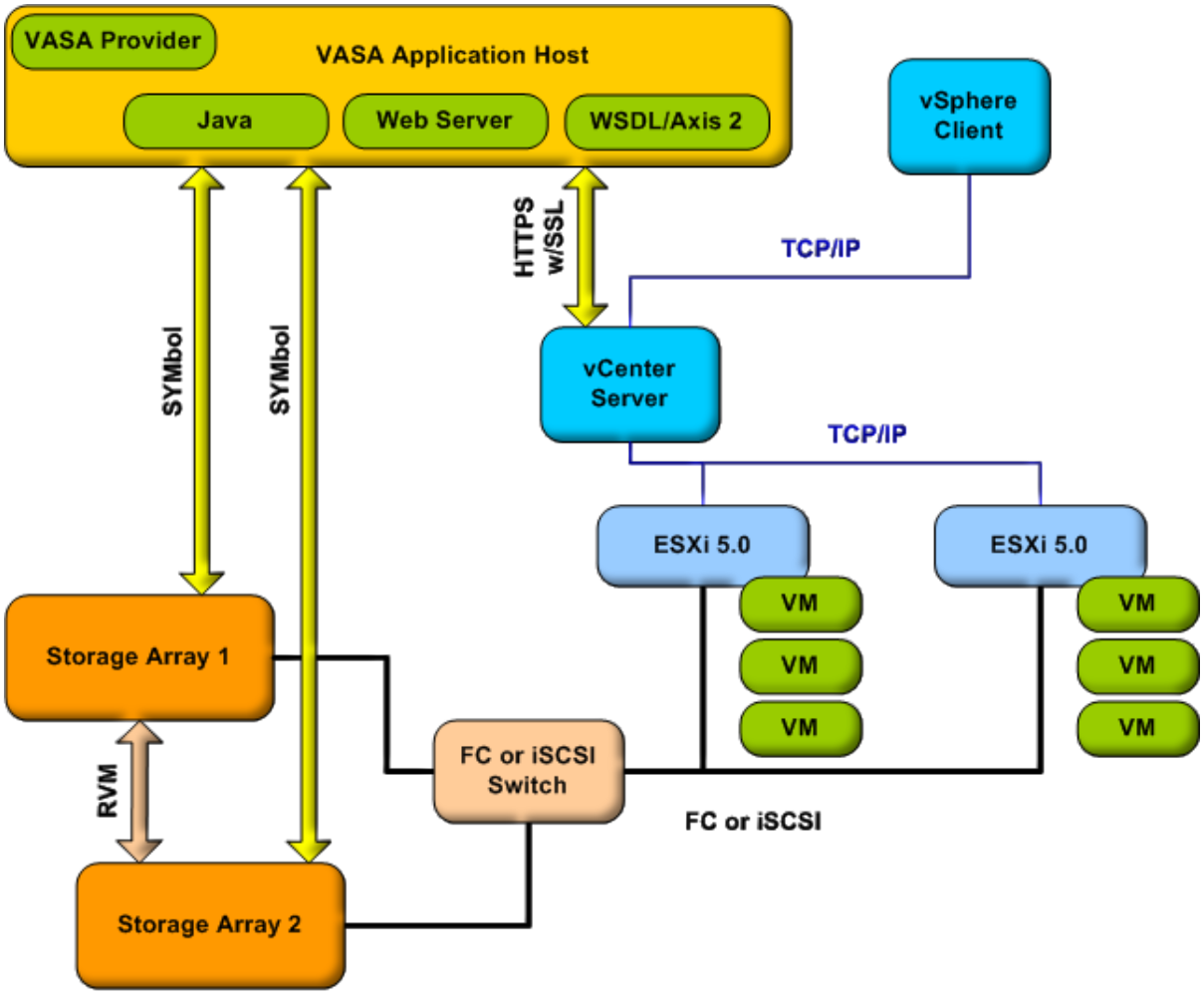
# Overview

The Dell MD Storage Array VMware® VASA 1.0 Provider is a set of extensible APIs that enable vCenter to see the capabilities of MD storage array LUNs and corresponding datastores.

The VASA Provider also enables an MD storage array to pass information about attached expansion storage enclosures on to the managing host server. Using the VASA Provider, you can discover and characterize a datastore's static capabilities, allowing you to easily select the appropriate disk for virtual machine placement and receive alert and event notifications from the VASA-monitored storage arrays within vCenter.

Figure 1.1 illustrates the VASA Provider architecture.

**Figure 1.1 VASA High-Level Architecture**



# VASA Storage Capabilities

Storage provisioning operations available in vSphere allow VASA to monitor whether a storage array's physical components can meet virtual machine needs according to defined capabilities. Available capabilities and their common performance ranges are shown in Table 1.1.

**Table 1.1 Available VASA Storage Capabilities**

| Storage Capabilities | Common Use/Performance Range |
|---|---|
| **SSD Drives** | Solid-state volumes, highest performance |
| **10K/15K Drives** | High-performance physical disks, used in most standard environments |
| **NLSAS Drives** | Near-line storage, intermediate performance |
| **Replicated SSD Drives** | Solid-state volumes, highest performance, redundancy provided |
| **Replicated 10K/15K Drives** | High-performance physical disks, used in most standard environments, redundancy provided |
| **Replicated NLSAS Drives** | Near-line storage, intermediate performance, redundancy provided |

Steps for assigning these capabilities in vSphere are detailed in *Using the VASA Provider* later in this guide

# Profile-Driven and Policy-Based Storage

The VASA Provider supports *profile-driven* storage by categorizing volumes by performance and reporting this information in the storage profile. Benefits of this approach include:

- rapid, intelligent provisioning of applications
- application service levels that match available storage
- better visibility into the available storage pool

*Policy-based* storage management supported in vSphere 5.0 helps you further provision virtual machines (VMs) by automating datastore placement decisions.

## Storage Service-Level Agreements

Features of the VASA Provider eliminate the need to maintain spreadsheets detailing the storage capabilities of each LUN in order to map correct service-level agreements (SLAs) to specific virtual machines.

Instead, you can deliver the best-matched resources to the SLA required by the VM. This is especially true in the case of storage resources, since storage environments are often be diverse and contain different types of storage with different performance and availability characteristics.

The VASA Provider allows you to discover and monitor storage array SLA properties based on availability, security and performance. You can then leverage array services to enforce storage VM SLAs and create end-to-end storage SLA guarantees for each virtual machine.

# Storage Distributed Resource Scheduler

The VASA Provider extends VMware's Distributed Resource Scheduler (DRS) functionality to data storage by enabling a Storage Distributed Resource Scheduler (SDRS) to operate on a group of datastores with similar capabilities. SDRS can determine whether a storage array can support SDRS migration, as well as whether migration is recommended.

## VASA Session Communications

All communications between the vCenter Server and the VASA Provider use Secure Sockets Layer (SSL) certificates. The VASA Provider can use a self-signed certificate or a certificate issued by a certificate authority (CA).

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# Installing the VASA Provider

This section describes how to install the VASA Provider, as well as installation requirements and prerequisites.

## Supported Operating Systems and Platforms

The VASA Provider is dependent on specific operating system and application platform requirements. Before installing and configuring VASA, make sure your environment meets the requirements detailed in this section.

### Required  Host Operating Systems

The VASA Provider application must be installed on one of the following Window host operating systems:

- Windows Server® 2003 SP2 (32-bit or 64-bit versions)
- Windows Server® 2008 R2 (64-bit version only)

**NOTE:** The VASA provider must be installed on a separate host server from the vCenter Server platform.

### Required VMware Platforms

The following VMware platforms must be installed and properly configured before installing the VASA Provider:

- VMware vSphere™ Client 5.0
- VMware vCenter Server 5.0 (installed separately from the VASA Provider)

For information on installing and configuring VMware platforms, see **http://www.vmware.com/support/product-support**.

For information on installing and using the vCenter plug-in on an MD storage array, see the *Dell MD Storage Array VMware® vCenter Plug-in User's Guide*.

### Required MD Storage Array Configurations

The VASA Provider is supported on the following Dell MD storage arrays:

- MD3200i, MD3220i, MD3600i and MD3620i (iSCSI)
- MD3600f and MD3620f (Fibre Channel)

Make sure your MD storage array has the latest RAID controller firmware version installed before installing the VASA Provider. For details on MD storage array firmware and operating system compatibility, see the Support Matrix available at **www.support.dell.com/manuals**.

### Configuring ESX to Automatically Detect MD Storage Arrays

When vCenter Server is installed, a host server should be able to automatically detect and configure Dell MD storage arrays. For this to occur, however, a proper SAN configuration must be in place and the LUNs between hosts and host groups must be properly balanced. For detailed information on properly configuring the SAN, including switch zoning requirements, refer to the following documents:

- *VMware Fibre Channel SAN Configuration Guide* (available from `www.vmware.com/support/product-support`)
- *Configuring Fibre Channel With Dell MD3600f Series Storage Arrays* (available from `www.support.dell.com/manuals`)

# Downloading the VASA Provider

The VASA Provider is available as a self-extracting, self-installing file from the Drivers and Download page at `www.support.dell.com`.

To download the VASA Provider:

1. Go to support.dell.com and select the **Drivers and Download** link.
2. Use the Dell product selector to find your MD storage array model. Choose **Select Model > Servers, Storage, Networking > PowerVault Storage**.
3. Under **Select Your Product Model**, choose your MD storage array model.
4. Click **Confirm** to display available drivers and downloads for your MD storage array model.
5. Under **Applications**, choose the VASA Provider download link.

# Installing the VASA Provider

Once you have downloaded the VASA Provider installation and copied it to the host server:

1. Launch the VASA installation wizard.
2. Review and accept the license agreement, then follow the installation prompts.

   The default installation path on a 32-bit Windows OS is: `C:\Program Files\Dell\Modular Disk Storage VASA Provider`.

   The default installation path on a 64-bit Windows OS is: `C:\Program Files (x86)\Dell\Modular Disk Storage VASA VASA Provider`.
3. Once the installation is complete, confirm that the MD Storage Array VASA Provider appears in the available programs list.

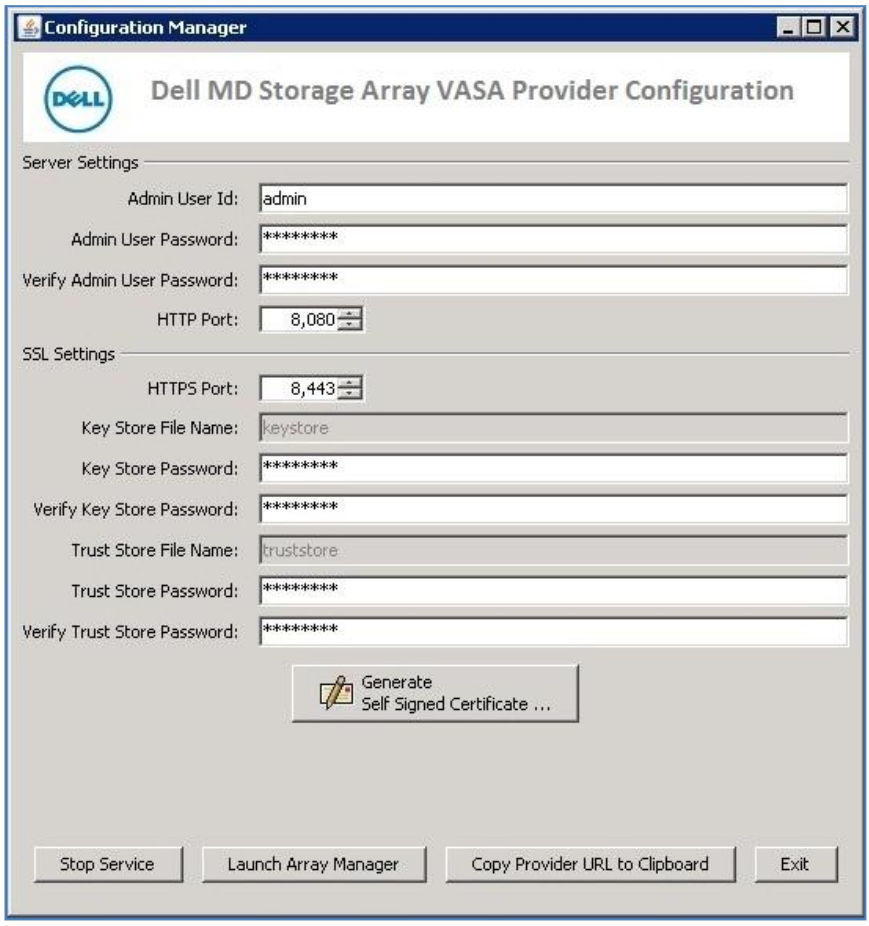
# Configuring the VASA Provider

After installing the VASA Provider, configure it for use in your environment by performing the following steps:

1. From the installation directory, click on the `VASAProviderManager.exe` file.

   The application server starts and the Dell VASA Application Server Configuration screen is displayed.

**Figure 2.1 Dell MD Storage Array VASA Provider Configuration window**




2. In the Dell MD Storage Array VASA Provider Configuration screen, choose usernames, passwords, and settings for the host server running the VASA Provider.

   **NOTE**: The default Admin User Password is `password`.

3. If you elect to configure security between VASA and vSphere using a self-signed certificate, click **Generate Self Signed Certificate**.

   **NOTE**: Using this option requires a thorough understanding of the security requirements in place at your site. Consult your local IT administrator before using this option.

4. Click **Start Service** to start the VASA Provider service.

   **NOTE:** Any time you change passwords using this screen, you must stop and start the VASA service for the password change to take effect. Choose **Stop Service** to stop the service, then **Start Service** to resume.

5. Click **Copy Provider URL to Clipboard** to capture the URL you will need to register the VASA Provider with vSphere.
6. Click **Launch Array Manager** to start the Dell MD Storage Array Management window.

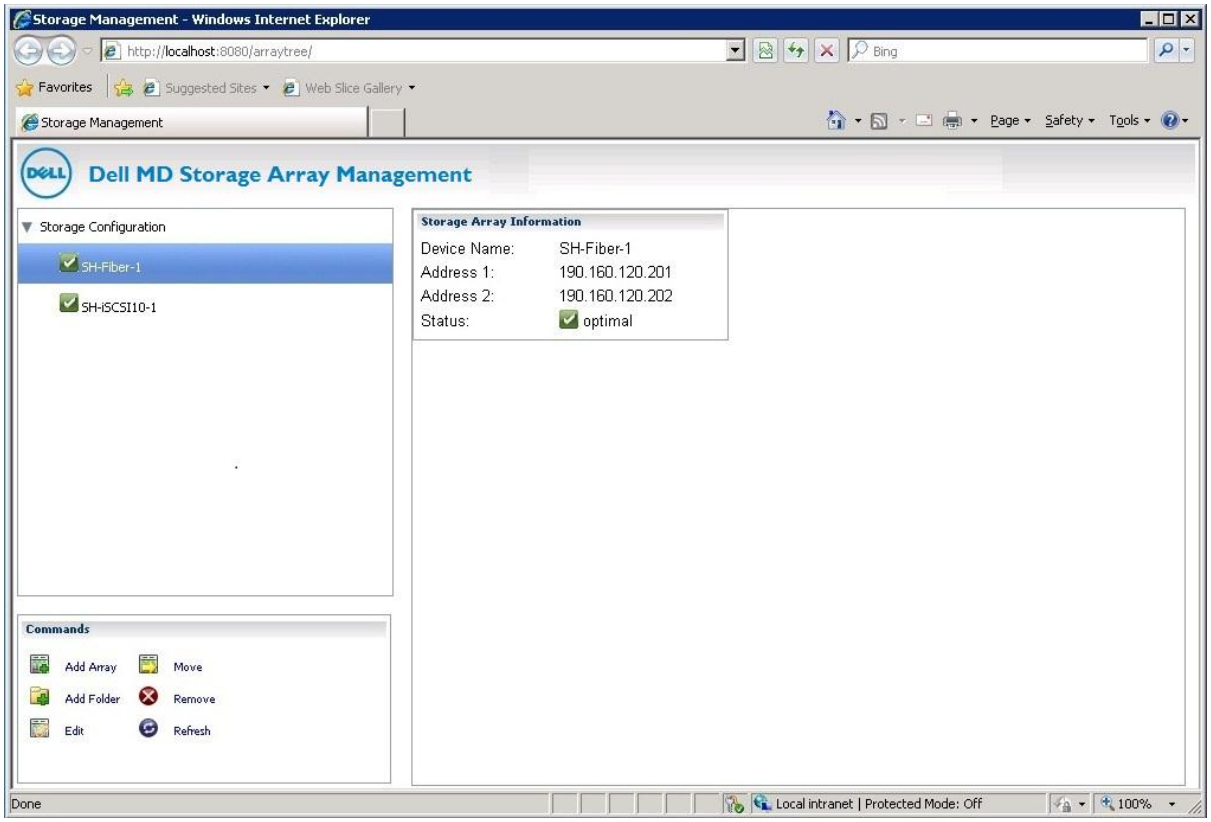
## Launching the Dell MD Storage Array Management Window

The Dell MD Storage Array Management window is a browser-based application that can be accessed from a supported browser or launched directly from the Configuration Manager. To launch Storage Array Management window, go to:

`http://<host_address>:8080/arraytree`

**NOTE**: If you are using static IP addressing, the *<host_address>* value will be a standard IP address. However, if you are using DHCP, the *<host_address>* value will reflect a DNS name.

**Figure 2.2 Dell MD Storage Array Management**




# Adding a Storage Array to VASA Control

To establish a storage array under VASA control, you must:

- Add the storage array to VASA
- Register VASA with vCenter Server

To add a storage array to VASA:

1. In the Command area of the Storage Array Management window, click **Add Array**. (You can also click **Add Folder** to create a separate container for a storage array group.)

   **NOTE**: When creating a new folder or adding an array using the Storage Array Management window, always make sure the Storage Configuration link in the left-side navigation pane is highlighted. Otherwise, you may inadvertently create/add the array to the root directory.
2. In the Add Storage Device window, enter the IP addresses for the RAID controllers in the storage arrays.
3. If required, enter the RAID controller password.
4. Repeat these steps to add other storage arrays to VASA control.

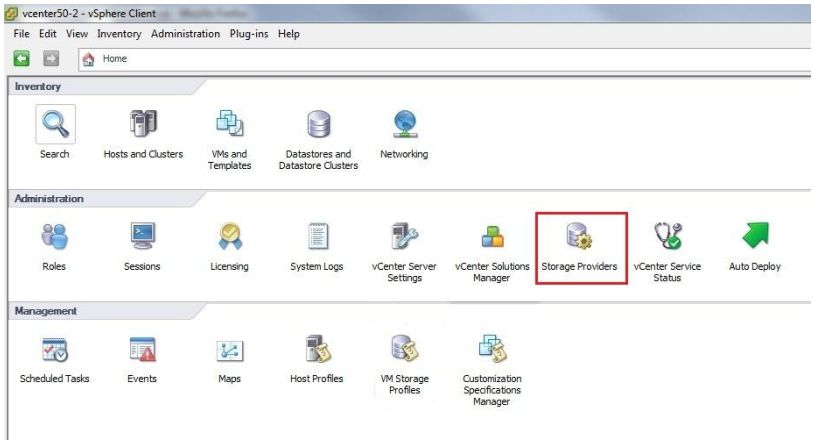
To register VASA with the vCenter Server:

1. Log into vSphere 5.0 Client and connect to the vCenter Server.

**Figure 2.3 vSphere Client Login Screen**

2. From the Home screen, click on **Storage Providers**.

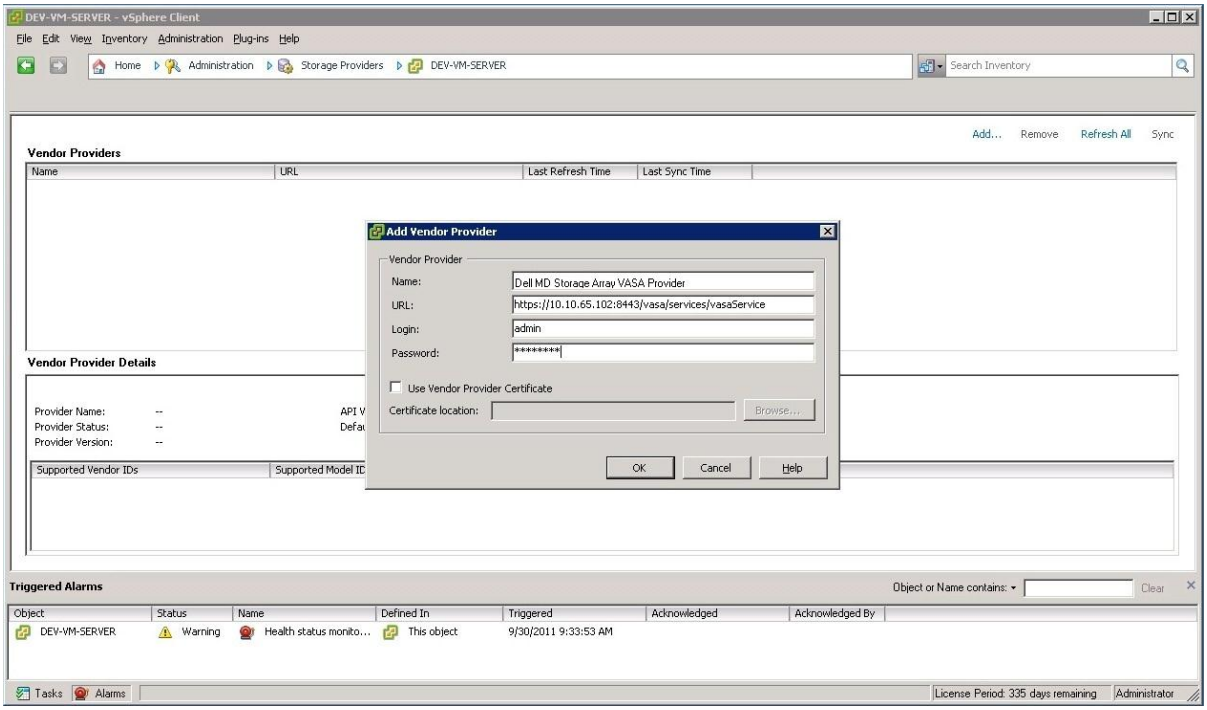
**Figure 2.4 vSphere Client Home Screen**




The Vendor Providers screen is displayed.

3. Click **Add** to display the Add Vendor Provider menu.

**Figure 2.5 vSphere Add Vendor Provider Menu**




4. In the Name field, enter a provider name.
5. In the URL field, either:
   - paste the URL you copied from the **Copy Provider URL to Clipboard** selection in the Dell VASA Application Server screen or
   - enter the URL of the VASA Provider service

   **NOTE:** If you are using the URL of the VASA Provider, append **`/vasa/services/vasaService`**. In the example shown, `https` specifies a secure server connection and `8443` is the default HTTPS port number for the VASA Provider. If you changed the port number in the Dell MD Storage Array VASA Provider Configuration window previously, use your actual port number in the URL.
6. In the Login field, enter the administrator user ID you specified in the Dell VASA Application Server window.
7. If required, enter a password.
8. Click **OK** to register the provider.

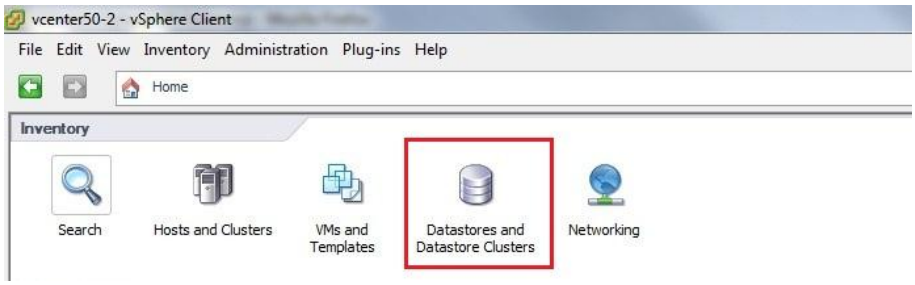
# 3

# Using the VASA Provider

After registering the VASA Provider, you should see a list of managed storage arrays in the Vendor Provider Details window. To verify the VASA configuration:

1. Select **Datastores and Datastore Clusters** from the vSphere 5.0 Client home page.

**Figure 3.1 vSphere Client Home Page**



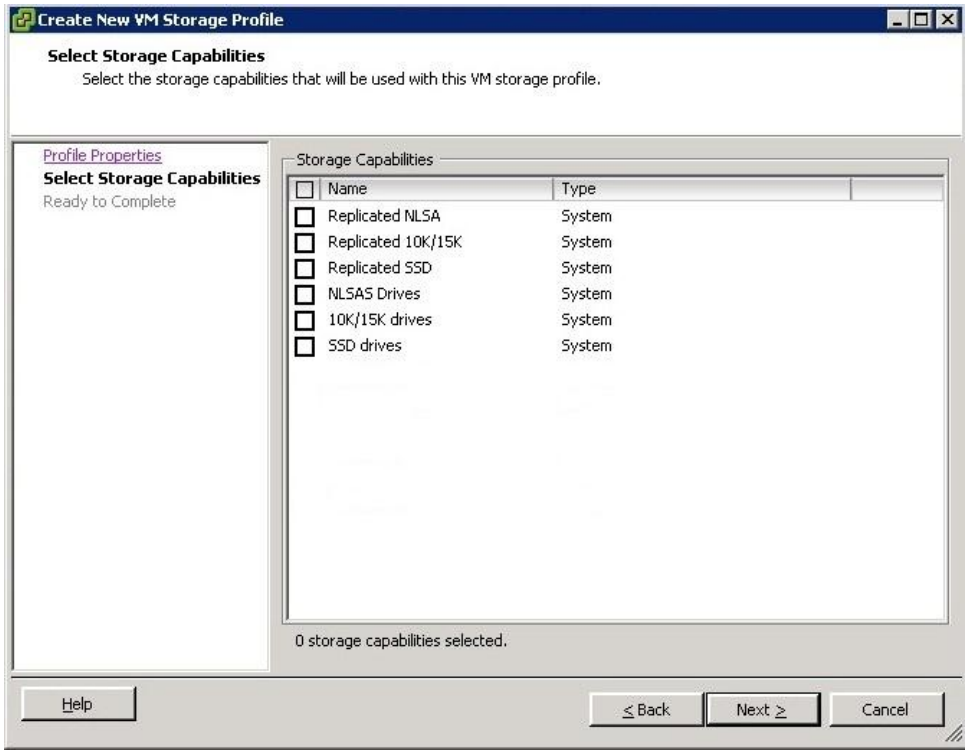

2. Select a datastore from a monitored storage array.
3. Click the Summary tab.

   You should see a capability category displayed under Storage Capabilities. These capabilities are generated by the VASA Provider based on the following criteria:

**Table 3.1 Storage Capabilities**

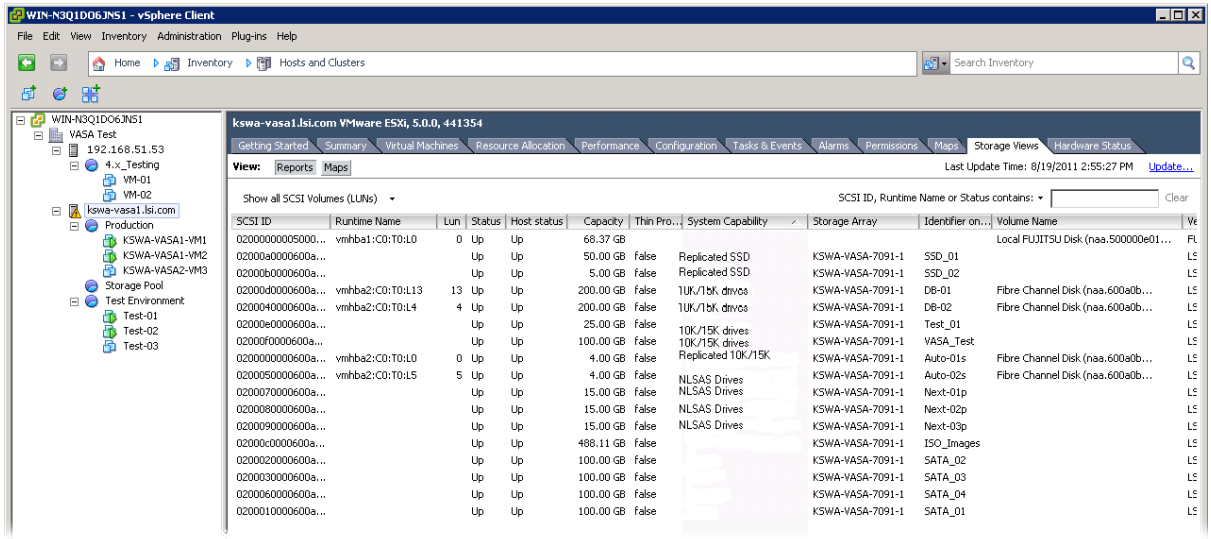
| Capability | Description |
|---|---|
| **SSD Drives** | A storage array virtual disk comprised of Solid State Drives (SSD). |
| **10K/15K Drives** | A storage array virtual disk comprised of 10K RPM or faster physical disks. |
| **NLSAS Drives** | A storage array virtual disks comprised of physical disks less than 10K RPM speeds. |
| **Replicated** (all types) | Any of the above capabilities, but remotely replicated |

**Figure 3.2 Available VASA Storage Capabilities**




Selecting the Storage Views tab, then selecting **Show all SCSI Volumes (LUNs)** displays a list of SCSI IDs, LUNs, capacity and other information.

**Figure 3.3 vSphere View of VASA-monitored Storage Arrays**

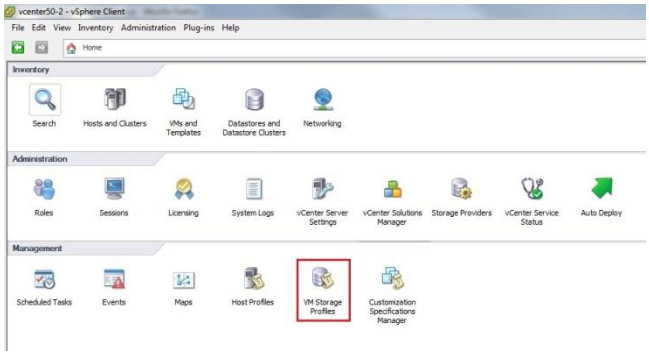


# Using Storage Profiles

You can create storage profiles to select datastores based on user-selected criteria. To enable VM Storage Profiles:

1. From the vSphere Client Home view, click **VM Storage Profiles**.

**Figure 3.4 vSphere Client Home Page**




2. In the vSphere home view, click **Enable VM Storage Profiles**.
3. In the Summary tab under Commands, click **Create VM Storage Profile**.
4. In the VM Storage Profile Properties window, enter the properties for the new profile, then click **Next**.
5. In the Select Stooge Capabilities window, select the storage capability (see Table 3-1) to be associated with the profile. Then, click **Next**.
6. Review the summary information, then click **Finish**.

## Assigning VM Storage Profiles to Existing Virtual Machines

After creating the VM Storage Profile(s), assign the profile to an existing virtual machine:

1. From the vSphere Hosts and Clusters view, select the virtual machine to be configured.
2. Right-click on the virtual machine and select **VM Storage Profile > Manage Profiles**.
3. From the Home VM Storage Profile drop-down menu, select the VM Storage Profile to be used and then click **Propagate to Disks**.
4. Click **OK** to apply changes.
5. On the Summary tab of the VM Storage Profiles window, click **Refresh** for the selected VM.

   The assigned profile should be displayed, along with the status of the VM under Compliance Status.

**Figure 3.5 Create VM Storage Profile**

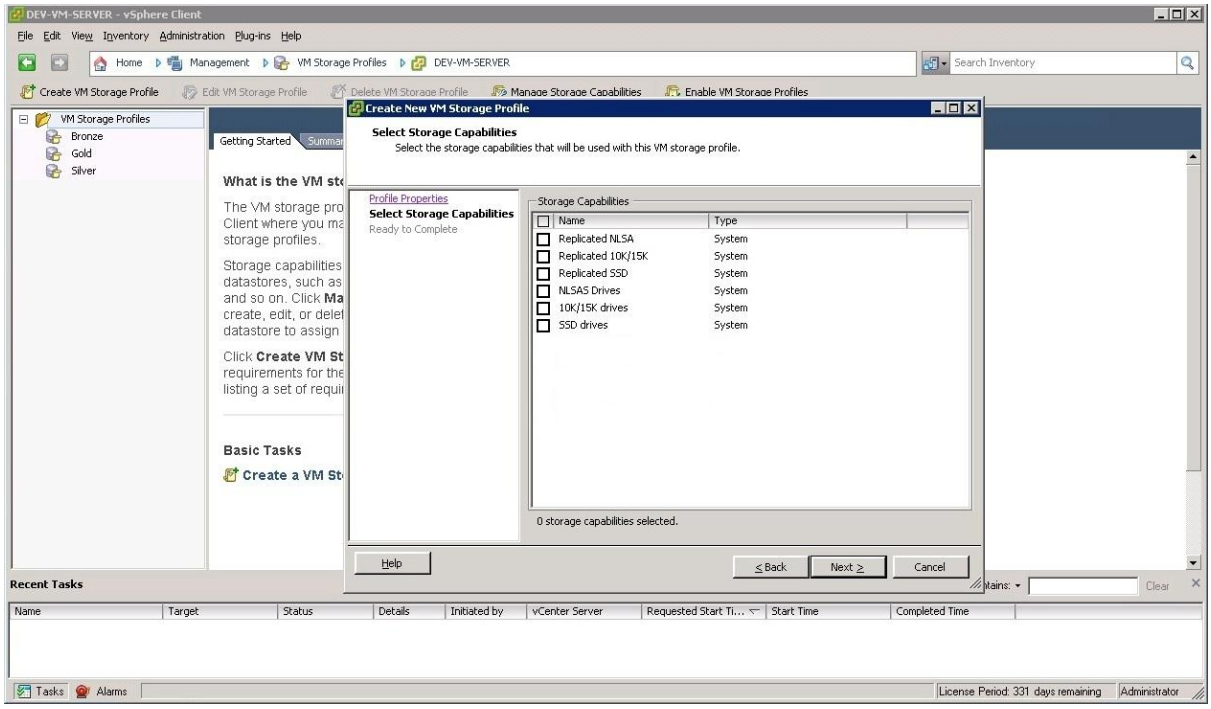
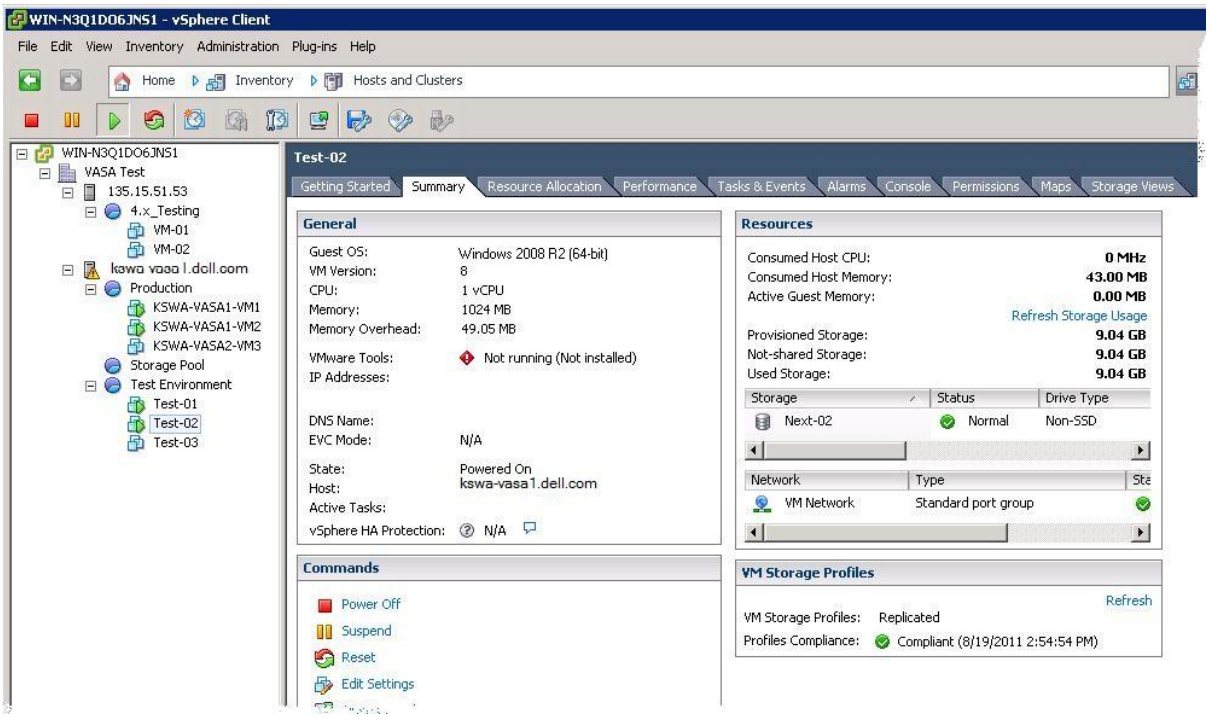


**Figure 3.6 vSphere Storage Profile Summary**



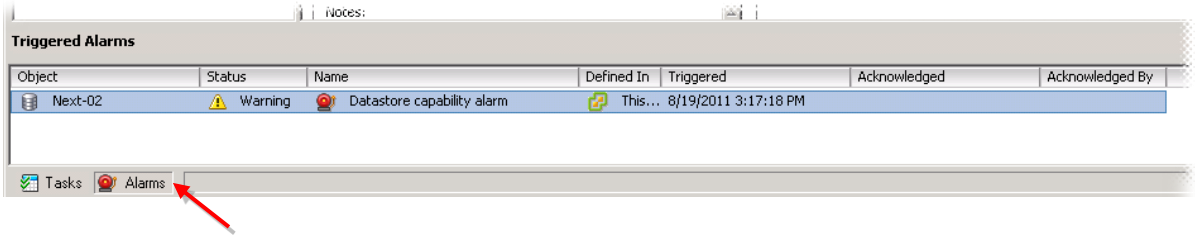

# Storage Array Events and Alerts

The VASA Provider propagates storage array alerts to the vCenter Server Event Monitor. Alerts are displayed on two separate views:

- on the Alert tab in the Tasks view for their respective property
- from the Alarms view at the bottom of the vSphere Client

Events are viewed by clicking on the Events icon on the vSphere Client Home view.

**Figure 3.7 Triggered Alarms View**


Triggered Alarms
Object Status Name Defined In Triggered Acknowledged Acknowledged By
Next-02 Warning Datastore capability alarm This... 8/19/2011 3:17:18 PM
Tasks Alarms

# Troubleshooting Tips

The table below shows some common issues and possible steps for resolution.

**Table 3.2 Issues and Corrective Steps**

| Issue | Possible Resolution |
|---|---|
| Unable to connect to the provider host | – Verify the proper URL for storage provider is registered.<br>– Verify that firewall settings allow for configured ports (default 8080 and 8443).<br>– Verify the VASA Provider service is started on provider host. |
| No datastore capabilities being displayed | – Verify that a valid vendor ID and model ID are listed for the registered storage provider in vCenter Server.<br>– Verify that monitored storage arrays have been added to the array manager.<br>– Verify the VASA Provider service is running on the provider host. |
| Unable to access the Array Manager | – Verify the URL for the Storage Array Manager is correct. (The default provider host URL is http://localhost:8080/arraytree/)<br>– Verify that firewall settings allow configured ports.<br>– Verify the VASA Provider service is running on the provider host. |
| Event messages do not display description information | This is a known issue with the VASA APIs and will be resolved in a future release. |

## Troubleshooting Logs

If further troubleshooting is required, Dell technical support may require that a copy of the working log directory be sent for analysis. The log directory is located on the VASA Provider host at `C:\Program Files (x86)\Dell\Modular Disk Storage VASA Provider\working\logs` (64 bit) and `C:\Program Files\Dell\Modular Disk Storage VASA Provider\working\logs` (32 bit).

## Configuration Reset

If the VASA Provider configuration needs to be reset to a clean configuration, perform the following steps:

1. Stop the Dell VASA Provider Application Server service on provider host.
2. Delete the `/db` directory in the `C:\Program Files (x86)\Dell\Modular Disk Storage VASA Provider\working` directory.
3. Delete the `/tmp` directory in the `C:\Program Files (x86)\Dell\Modular Disk Storage VASA Provider\working` directory.
4. Start the Dell VASA Provider Application Server service on the provider host.

This will remove the alert information and cached data from the VASA Provider application server. However, monitored storage array information is retained.

# 4

# Uninstalling the VASA Provider

You can uninstall the VASA Provider in one of two ways:

- from the Windows **Add and Remove Programs** option
- using the VASA Provider uninstaller (located at `C:\Program Files (x86)\Dell\Modular Disk Storage VASA Provider\Uninstall_Modular Disk Storage VASA Provider`)

Once the uninstall is complete, verify that all application files and folders are deleted.

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# Getting Help

## Contacting Dell

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

1. Visit **support.dell.com**.
2. Click your country/region at the bottom of the page. For a full listing of country/region click **All**.
3. Click **All Support** from Support menu.
4. Select the appropriate service or support link.
5. Choose your preferred method of contact.